Lecture 7

Inflation and Unemployment

M&I 6

Adaptive vs "Rational" Expectations

M&B 19, p. 24

Inflation and Unemployment

Second of 3 motives gov't may have for $\Delta M/M$, π :

- 1. Inflationary Finance (Seigniorage)
- 2. Reduce U / stimulate y \leftarrow Today
- 3. Reduce i and/or r (M&B 19)

The Phillips Curve (PC)

Observed negative correlation between Inflation π and Unemployment U.

0`

3

4

7

8

5

Unemployment Rate (annual avg.)

6

π VS U, 1956-1969: (Phillips 1958 originally used earlier UK data and ΔW/W, but graph similar.) (PC drawn as straight line for simplicity.)

Economists (eg Samuelson and Solow 1960) originally thought PC gave policy makers a *permanent tradeoff* between π and U: π and U both bad, but suggested Fed should encourage a little π to reduce U. (Nobel Prizes, 1970, 1987) However – PC shifted over time – Outward, 1953-83

"Stagflation" became a concern: High U *and* high π!

Is economy doomed to ever higher U and π? "Stagflation"

SRPC = Short-Run Phillips Curve low, 1953-69 highest, 1979-83



h/t Byron Chapman

But then SRPC quickly moved *back down*, 1983 – 2008:

- '50s, '60s low
- '70s rising fast
- '79-'83 highest
- '84-'93 much lower
- '95-'08 like '60s.
- 1. Why does PC shift?
- 2. Why is there a SR tradeoff?



Typical Market

No
$$\pi$$
: D₀, S₀, P₀, Q₀



No
$$\pi$$
: D₀, S₀, P₀, Q₀

Fully anticipated $\pi = \pi^{e}$: D \uparrow to D₁, vertically by π^{e} , S \uparrow to S₁, vertically by π^{e} .

⇒ P ↑ to P₁ by
$$\pi^{e}$$
, as expected,
Q remains Q₀

 $\Rightarrow \pi = \pi^{e} \text{ does not affect}$ production or U.





 D_2

Quantity Q



$$\Rightarrow \mathsf{P} \uparrow \mathsf{to} \mathsf{P}_2, \ \pi > \pi^{\mathsf{e}}, \\ \mathsf{Q} \uparrow \mathsf{to} \mathsf{Q}_2$$

$\Rightarrow \pi > \pi^{e}$ increases production, reduces U.

Typical Market



Unanticipated DEflation, caused by M/P < m^D: $D \downarrow$ to D₂, horizontally, by Walras' Law, *S unchanged*.

Price
P
P₀
P₃

$$P_0$$

 P_3
 Q_3 Q_0
Quantity Q

$$\Rightarrow \mathsf{P} \downarrow \mathsf{to} \mathsf{P}_3, \, \pi < \pi^{\mathsf{e}}, \\ \mathsf{Q} \downarrow \mathsf{to} \mathsf{Q}_3$$

 $\Rightarrow \pi < \pi^{e}$ DEcreases production, INcreases U. Natural Unemployment Rate Hypothesis: Milton Friedman, Edmond Phelps, 1968 (Nobel Prizes, 1976, 2006)

π

If π fully anticipated (as in Long Run), U unaffected by π, tends to "Natural Unemployment Rate" U_N.

⇒ Long Run Phillips Curve (LRPC) vertical at U_N (when π on vertical axis, U on horizontal axis)



Natural Unemployment Rate Hypothesis: (Milton Friedman, Edmond Phelps, 1968)

But – If $\pi \neq \pi^{e}$ (as in Short Run), $\pi > \pi^{e} \rightarrow U < U_{N},$ $\pi < \pi^{e} \rightarrow U > U_{N}.$ \Rightarrow There is a permanent tradeoff between

unanticipated $\pi \& U$.



Natural Unemployment Rate Hypothesis: (Milton Friedman, Edmond Phelps, 1968)

But – If $\pi \neq \pi^{e}$ (as in Short Run), $\pi > \pi^{e} \rightarrow U < U_{N},$ $\pi < \pi^{e} \rightarrow U > U_{N}.$

⇒ There is a permanent tradeoff between unanticipated π & U.

> And, there is a different Short Run PC (SRPC) for every π^{e} , intersecting LRPC at π^{e} .







Acceleration Hypothesis (Hayek, *A Tiger by the Tail*, 1972)



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Acceleration Hypothesis

F.A. Hayek, A Tiger by the Tail, 1972, Nobel Prize 1974



and $U = U_N$.

Disinflation (stopping ongoing π)



Disinflation (stopping ongoing π)



Disinflation (stopping ongoing π)

Requires $U > U_N$ if expectations adaptive

B. Gradualism $U_{Max} = Max \text{ tolerable U}$ $\pi \downarrow \text{ in small steps}$ $\Rightarrow U \leq U_{Max}$ but takes longer than Cold Turkey!



Natural U Rate U_N also known as NAIRU:

Non-Accelerating Inflation Rate of Unemployment similar idea, but suggests low U causes π .

Natural Rate Hypothesis (NRH) \Rightarrow

M policy may affect U, y **temporarily**, but **must be neutral on average** to prevent accelerating π . \rightarrow Stimulus during recessions requires

 \Rightarrow Stimulus during recessions requires

restriction during good times.

This principle incorporated into *Taylor Rule* (M&B 21)

Caveat -- Natural Rate may vary with

- Efficiency of Labor Market, eg internet
- Turnover of jobs, eg after WW II
- Degree of unionization
- Composition of Labor Force
 - Postwar baby boom
 - Institutional population "not part of Labor Force":
 - military 1 900,000 1965-73
 - prison pop. 500,000 in 1980, 2,400,000 in 2008.
- Minimum Wage
 - 141%, 2007-2009, affects low-skill most
- Unemployment compensation
 - up to 99 weeks in current recession, just renewed thru 1/12
 - never before so long
 - avg. duration of U = 37.1 wks. 2/11, vs 20.8 wks. 6/83.

Variation in U_N over time (McCulloch 2007 estimates)

1960-70	5.7%
1980	6.7%
1990	6.2%
2000	5.2%
2007	5.0%

2009, 2010 U abnormally high, relative to π !

¿ Caused by extended U benefits? 2007-09 ↑ in Min. W?



Expectations Models

1. Adaptive Learning (AL)

(Evans and Honkapohja, 2001)
Expectations based on past experience, with declining, time-varying weights
Past π best single predictor of future π, though U, M policy, etc. may also be useful
Modern generalization of Adaptive Expectations (AE) (Friedman, Cagan, 1950s, 60s)

2. Equilibrium or "Rational" Expectations ("RE")

Expectations = best forecast using true structure of economy true intentions of policy makers all data, public and private Dominant assumption in economics, 1970s-90s Lucas, Sargent, Wallace, Prescott Nobel prizes, 1995, 2011, 2004 Implications of AL, AE:

- P → P* only gradually, since P* unknown, π^e drives π in SR
- Policy can fool public in SR
 - $s^* > s_{Max}$ feasible but \Rightarrow accelerating π
 - U* < U_N feasible
 - but \Rightarrow accelerating π
- Disinflation costly in SR since U > U_N, s below Laffer Curve until π^e ↓ to π
- High π costly in terms of high future π^e
- Low π a good investment in low future π^e

Implications of Equilibrium ("Rational") Expectations:

- $P \rightarrow P^*$ immediately,
 - since public knows M, m^D, has taken Econ 520
 - \Rightarrow P tracks M/m^D with no lag
- Policy can't fool public, not even in SR
 - $s^* > s_{Max}$, $U^* < U_N$ **not** feasible
 - $\Rightarrow P \rightarrow \infty$ immediately
 - i.e. $1/P \rightarrow 0$, M worthless, since
 - public knows policy inconsistent
- Disinflation costless
 - since $\pi^{e} \downarrow$ immediately, so no recession
- High π costless in terms of high future π^e since π^e doesn't depend on past π
- Low π has no payoff in terms of low future π^e for same reason

Equilibrium ("Rational") Expectations, cont'd.

- Economic orthodoxy, 1970s-90s
 - Lucas, Sargent, Wallace, Prescott
- Useful exercise to study internal consistency of policies
- But unrealistic as model of actual expectations, IMHO*
- "Rational" a misnomer
 - "Equilibrium Expectations" more accurate, IMHO
- 1990s, 2000s -

Movement away from "RE": "Bounded Rationality" -- Sargent "Adaptive Learning" -- Evans and Honkapohja

"Adaptive Least Squares" estimation procedure

-- McCulloch

* In My Humble Opinion